Making Gastrointestinal Endoscopy Safer

Sanjay Ramrakha MBBS FRACGP FACEM

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CERTIFICATE OF AUTHORSHIP / ORIGINALITY

I hereby certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree, except as fully acknowledged within the text.

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Dr Sanjay Ramrakha

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ABSTRACT

Endoscopic procedures have become the ‘gold standard’ of diagnosis and therapy in the alimentary tract and are frequently delivered in high volume centres. Given that the generic term ***endoscopy*** is broad, in this thesis, panendoscopy will refer to *“upper gastrointestinal”* procedure and colonoscopy will refer to *“lower gastrointestinal”* procedure.

In such procedures, complications can be attributed to the bowel preparation, the procedure itself and/or the effects of the sedative/anaesthesia. This thesis reports on an anonymous postal survey of Australian practice of endoscopic procedures and identifies system issues in the delivery of sedation. In particular, there is an unacceptable morbidity and mortality rate seen in some public endoscopy units. Therefore, there is scope to improve levels of safety in gastrointestinal endoscopy.

The first half of this thesis focuses on sedation-associated cardio respiratory embarrassment, a common cause of morbidity and mortality. This thesis examines the changes in cardio- respiratory parameters associated with sedation. Expanding on this knowledge the thesis describes the development of a novel oxygenating bite-block with capacity to sample carbon dioxide. The device, when tested against conventional delivery systems in a comparative clinical study shows, superiority in monitoring of ventilation.

The second half of this thesis focuses on the complications associated with bowel preparations relating to their palatability, their purgative effect and dehydration. Effective purgation is essential to reduce the missed pathology rate. The development of a novel bowel preparation to improve safety was trialled in a comparative clinical study against three other methods. Lessons learnt from this study led to the process of further enhancement to the development to formulate a capsule bowel preparation.

Improvements in oxygen delivery, ventilation monitoring and bowel preparation described in this thesis will significantly increase the safety of gastrointestinal endoscopy